

## CLAIMS

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We claim:

- 10 *sub 1* *sub 2*
- 1) A fuel tank tester comprising a source of gas pressure, means for determining the pressure within the fuel tank, a reference orifice, means for directing gas from the fuel tank to the atmosphere, and means for directing gas from the fuel tank to said reference orifice, (means for determining [the time required for the pressure within the fuel tank to decay between predetermined pressure values when said means for directing gas from the fuel tank to the atmosphere is actuated] and [the time required for the pressure within the fuel tank to decay between predetermined pressure values when said means for directing gas from the fuel tank to the atmosphere and said means for directing gas from the fuel tank to said reference orifice are actuated], and means for comparing said times determined by said time determining means with predetermined time values.

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- 2) The tester as defined in claim 1 wherein said means for directing gas from the fuel tank to the atmosphere is a first valve means.
- 3) The tester as defined in claim 1 wherein said means for directing gas from the fuel tank to said reference orifice is a second valve means.

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- 4) The tester as defined in claim 1 wherein said pressure determining means is fluidically connected to the fuel tank.

- Sub A2 Sub E1
- 5) The tester as defined in claim 1 further including a microprocessor to control said means for directing gas from the fuel tank to the atmosphere and to control said means for directing gas from the fuel tank to said reference orifice.

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- 6) The tester as defined in claim 5 further including means for comparing a pressure value determined by said pressure determining means with a predetermined pressure value and means for producing an output signal in response to said comparison.

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- 7) The tester as defined in claim 6 wherein said means for comparing said pressure determined by said pressure determining means is a voltage comparator.

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- 8) The tester as defined in claim 7 further including a plurality of light emitting diodes operatively connected to said microprocessor, the operation of said light emitting diodes being controlled by said microprocessor and providing a visual indication as to whether the fuel tank under test has an acceptable leakage rate.

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- Sub A3 Sub E2
- 9) A method for testing a fuel tank comprising the steps of:
- a) Pressurizing the fuel tank to a predetermined first pressure;
  - b) Permitting gas within the fuel tank to decay until a predetermined second pressure has been reached;
  - c) Actuating a timer when said predetermined second pressure has been reached;
  - d) Allowing gas from the fuel tank to continue to decay until a predetermined third pressure has been reached;

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- e) Storing the elapsed time on the timer and stopping gas flow from the fuel tank; and
- f) Comparing said elapsed time on the timer with a predetermined time for said pressure decay to determine whether the fuel tank has an acceptable leakage rate.

10) The method as defined in claim 9 further including, after step f, the following steps:

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- g) Repressurizing the fuel tank to said predetermined first pressure;
- h) Permitting gas within the fuel tank to pass through a reference orifice until said second predetermined pressure has been reached;
- i) Actuating said timer when said second predetermined pressure has been reached;
- j) Allowing gas from the fuel tank to continue to pass through said reference orifice until a predetermined fourth pressure has been reached;
- k) Storing the elapsed time on the timer and stopping gas flow through said reference orifice;
- l) Repressurizing the fuel tank to said predetermined first pressure;
- m) Permitting gas within the fuel tank to decay until said second predetermined pressure has been reached;
- n) Actuating said timer when said second predetermined pressure has been reached;
- o) Allowing gas from the fuel tank to continue to decay until said predetermined fourth pressure has been reached;
- p) Storing the elapsed time on the timer and stopping gas flow from the fuel tank; and

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